

How Ligaments Work and Heal

Ligaments are the joint's straps: tough bands that tie bone to bone, hold joints in line, and quietly tell your brain where the joint is in space. When a ligament is overstretched or torn (a "sprain"), the joint can feel loose or give way. One of the most useful things to understand about ligaments is that **where a ligament lives decides whether it can heal**: some, like the collateral ligaments at the side of the thumb or elbow, mend on their own; others, like the small but vital ligaments *deep inside* the wrist, famously do not. This page explains, in plain language, what ligaments do and how they heal, then goes deeper into why that difference exists for the curious reader.

What a ligament is and what it does

A ligament is a short, strong band of mostly **collagen** running from one bone to another across a joint. It does two jobs: it is a **check-rein** that stops the joint moving too far or in the wrong direction, and it is a **sensor**, packed with nerve endings that feed back the joint's position and movement (a sense called proprioception). That sensing is why a joint with a damaged ligament can feel unstable or untrustworthy even when it looks normal.

How ligaments heal (and why some don't)

A sprained ligament heals much like other tissues: bleeding and inflammation, then new collagen laid across the gap, then slow remodelling and strengthening over months. Many ligaments heal well this way, especially with a period of protection (a splint) and graded return to load.

But not all. A ligament's ability to heal depends heavily on where it sits:

- Ligaments **outside** the joint capsule (like the **collateral ligaments of the thumb or elbow**) have a good blood supply and can form a healing bridge; most recover without surgery.
- Ligaments **inside** the joint (like the **scapholunate ligament** deep in the wrist) sit bathed in joint fluid, which prevents a healing clot from forming across the torn ends. These tend not to heal, and when stability matters they are usually repaired early or reconstructed surgically rather than left alone.

What helps

- **Protected loading.** A splint that allows controlled movement guides healing collagen to align, while preventing the over-stretch that would re-injure it.
- **Rehabilitation for the sensors, not just the strap.** Because ligaments provide position sense, balance and proprioception exercises are a key part of recovery and of preventing re-injury.
- **Strengthening the surrounding muscles,** which share the job of stabilising the joint.
- **Time.** Ligament remodelling runs for many months; a “healed” sprain keeps gaining strength well after it stops hurting.

In more depth

This section steps up to a more detailed, student-level explanation. It isn’t needed to understand a sprain. But if you’re curious about *why* a ligament deep in the wrist won’t heal when a thumb ligament a few centimetres away will, read on.

LIGAMENT AS LIVING TISSUE

Like tendon, a ligament is built mostly of **type I collagen** in aligned bundles, giving it great tensile strength, with resident cells (fibroblasts) maintaining the matrix and a relatively sparse blood supply. Compared with tendon, ligament collagen is a little more interwoven (bundles run in slightly varied directions), suiting it to resist loads from several directions as a joint moves. Ligaments are also rich in **specialised nerve endings** that sense stretch and position; they are sensory organs as much as mechanical straps.

WHY LOCATION DECIDES HEALING: THE WRIST VERSUS THE THUMB

The principle is inside the joint versus outside it, and the upper limb shows both sides clearly.

The scapholunate ligament sits *inside* the wrist joint, between two of the small carpal bones, bathed in **synovial fluid**. When it tears completely, that fluid washes away any clot, so no bridge ever forms for repair cells to cross; its blood supply is poor and the torn ends pull apart. The cells are willing, but with no scaffold spanning the gap, the ends simply never reconnect. So a complete scapholunate tear generally does not heal on its own, and, if missed, the wrist bones gradually fall out of line and wear out (a pattern surgeons call SLAC). That is why these injuries are repaired early or reconstructed when stability matters.

Contrast that with the collateral ligaments at the side of the thumb or elbow, which lie *outside* the main joint cavity. They have a better blood supply, a clot can bridge the torn ends, and most partial tears heal well with a period of splinting: the classic example is a sprained thumb (“skier’s thumb”). There is a neat exception that proves the rule: in a *complete* thumb-collateral tear, the torn end can flip back out of reach of its bony attachment (a “Stener lesion”), and then (just like the wrist ligament) it cannot heal because the two ends are no longer in contact, so it needs surgical repair.

LIGAMENT RECONSTRUCTION AND “LIGAMENTISATION”

When a key ligament won't heal (a chronic scapholunate tear, or a high-demand elbow or thumb ligament), surgeons may **reconstruct** it from a **graft** (a piece of the patient's own tendon, or a donor tendon) threaded across the joint where the ligament used to be. At first the graft is essentially non-living collagen. Over the following year it undergoes **ligamentisation**: the body's cells and blood vessels invade it, the dead collagen is gradually replaced, and it remodels into something ligament-like. This takes many months, the graft is temporarily *weaker* during the early remodelling phase (one reason return to heavy use is staged carefully), and the result, while good, is never a perfect copy of the original, including some loss of the natural position-sensing.

PROPRIOCEPTION AND WHY A STRETCHED JOINT FEELS UNSTABLE

Because ligaments carry position-sensing nerve endings, a damaged ligament doesn't just weaken the mechanical check-rein; it also degrades the joint's sense of where it is. This is why a joint after a sprain can feel like it might “give way” even when it is mechanically reasonable, and why rehabilitation deliberately retrains balance and proprioception, not just strength. Restoring that sense is a real part of preventing the next injury.

WHAT HELPS AND HARMS LIGAMENT HEALING

- **Controlled load and proprioceptive training** are the key stimuli; immobilising a joint completely weakens both the ligament and its sensing.
- **Blood supply and location** set the ceiling: extra-articular ligaments heal, intra-articular ones often don't.
- **Smoking, diabetes and age** impair healing, as they do across all tissues.
- **Instability left untreated** lets the joint repeatedly shift out of line, which can wear out the cartilage over time; this is why some ligament injuries are repaired or reconstructed even when the ligament itself isn't especially painful.

See also

- [How tendons work and heal](#) – ligament's close cousin (bone-to-bone vs muscle-to-bone)
- [How cartilage works](#) – what an unstable joint can wear out
- [How bone heals and remodels](#) – the bone these straps anchor into